Powers Lake Watershed Restoration Action Strategy Phase II

Project Sponsor:
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STATE: North Dakota

WATERSHED: Powers Lake
Watershed

HYDROLOGIC UNIT CODE: 10110101

PRIORITY WATERSHED: no

TMDL Development and/or Implementation: Yes

(Check any that apply)

PROJECT TYPES	**WATERBODY TYPES**	**NPS CATEGORY**
[] STAFFING & SUPPORT	[] GROUNDWATER	[X] AGRICULTURE
[X] WATERSHED	[X] LAKES/RESERVOIRS	[X] URBAN RUNOFF
[] GROUNDWATER	[] RIVERS	[] SILVICULTURE
[] I&E	[X] STREAMS	[] CONSTRUCTION
	[X] WETLANDS	[] RESOURCE EXTRACTION
	[] OTHER	[] STOWAGE/LAND DISP
		[] HYDRO MODIFICATION

PROJECT LOCATION: LATTITUDE: 48N 34' 19" LONGITUDE: 102W 40' 06"

MAJOR GOAL: The Powers Lake Implementation Project is designed to provide technical, financial, and educational assistance to landowners within the watershed and restore the lake. Areas targeted for assistance are in-lake projects, agricultural lands, manure management and education. The goal is to achieve and maintain fully supporting status of the recreational uses of Powers Lake by reducing phosphorus and nitrate loading to the lake as well as reduce the internal cycling of nutrients. This phase of the project is to start reducing the internal cycling of the nutrients within the lake with some emphasis on continue improving the watershed.

PROJECT DESCRIPTION: Project sponsors intend to; 1) develop and implement ways to improve the water quality in the lake, 2) provide technical and financial assistance to lands impacting water quality, 3) continue working partnerships with the local natural resource agencies, 4) develop educational programs to heighten public awareness of NPS pollution concerns and solutions, and 5) track water quality trends to rectify concerns as they surface.

FY11 319 funds requested: $332,350

Match: $224,567

Other Federal Funds: $ 86,500

Total project cost: $ 643,471

2.0 Statement of Need

2.1
The Powers Lake Watershed Project was needed to improve and protect the water quality in Powers Lake. Problems with the water quality have been identified in the 2000-2001 Water Quality Assessment conducted by the City of Powers Lake and the ND Department of Health. Excess phosphorus loading entering the lake are contributing to the undesirable balance of phosphorus causing a hypereutrophic condition in the lake. Phase I of the project was addressing these watershed issues. The conservation practices that were installed during this phase greatly benefited the water quality entering the lake. See Appendix 2.

Phase II will be looking at reducing the internal nutrient recycling in the lake. Based on the 2006 Section 303(d) List of Impaired Waters Needing Total Maximum Daily Load (TMDL) (NDDDoH 2006), the North Dakota Department of Health (NDDoH) has identified Powers Lake as fully supporting, but threatened for aquatic life uses due to nutrients, sediment, and low dissolved oxygen levels, and fully supporting, but threatened for recreational uses due to nutrients. That goal was revised in 2008 with the completion of the Powers Lake TMDL report that Powers Lake needed a reduction 0f 75% of nutrient loading and 50% reduction of internal phosphorus load (NDDoH, 2008).

The Phase II of this project is only a stepping stone to what the committee will be looking at beyond this phase to fully complete the recovery process of Powers Lake. We are already looking into a Phase III for the Powers Lake Restoration Project.

Powers Lake is located on the south edge of the City of Powers Lake and is used year round. Camping, fishing, picnicking, hiking, bird watching, swimming, boating and other activities are important to the City of Powers Lake and visitors.

2.2
Powers Lake is a 1,616-acre lake that serves as a recreational area for the town of Powers Lake and Mountrail and Burke Counties. The lake serves as a classroom for Powers Lake Public School, a bird and fish habitat, and many other uses.

In-lake water quality data collected in 2000-01 indicates that Powers Lake is a nitrogen limited reservoir. A lake is assumed to be at nutrient equilibrium when the ratios of nitrogen to phosphorus is between 10:1 and 15:1, the ratio for Powers Lake was 5:1 in 2001 indicating it is nitrogen limited. The excess nutrient is phosphorus.

The Powers Lake Water Quality Assessment Project carried out in 2001 shows the lake is in a hypereutrophic state. To move the lake toward a mesotrophic state, external phosphorus loading would need to be reduced by 50% and reduction of the internal load by 50% as the goals that were set in Phase I of the project. In 2008 a TMDL report states that we need to reduce the loading by 75% and the internal load by 50% to achieve the goals set forth by the Project and the ND Department of Health standards.

2.3
See attached maps (Appendix #1)

2.4
The Powers Lake Watershed is fed by four tributaries draining a surface area of 44,458 acres. See Appendix 1.

All sub-watersheds, with the exception of the immediate watershed, which is very small (<500 acres) surrounding Powers Lake have associated water quality and quantity data.

For the entire Powers Lake watershed, approximately 65.63 percent of the watershed is cropped and 29.69 percent is in some form of permanent grass or herbaceous cover. Land use in permanent cover is divided into range/pasture land (17.19%), hayland (6.25 %), Conservation Reserve Program (6.25%), and other uses (4.68%).

2.5
Five locations within the Powers Lake watershed were monitored for concentrations of nitrogen, phosphorus, total suspended solids and fecal coliform bacteria from spring thaw through October 30, 2001 and again during the runoff events from 2006-2009. In-lake water quality data, collected during the 2001 sampling season, indicates that Powers Lake is hypereutrophic, nitrogen limited water body that does not thermally stratify. Also, the assessment project identified that Powers Lake is hypereutrophic from both external and internal pollution sources. Manual stage and periodic flow measurements were collected to provide loading estimates. Loading estimates were facilitated utilizing the U.S. Corps of Engineers "FLUX" model.

The internal sources are most likely stored in the lake sediments and become available for primary production through both wind/wave action and internal releases during anoxic and near anoxic conditions. In-lake water quality data and stream load were used to calibrate the U.S. Corps of Engineers Bathtub Model. Multiple simulations of the calibrated trophic response model were run to identify the amount of reduction in external and internal loads of phosphorus and nitrogen required to get an improvement in the lake's trophic condition.

Conservation practices were installed during Phase I of the project from 2003-2010 have greatly benefited and improved the water quality within the watershed. The watershed will need to continue to install conservation practices to get a 75% reduction of loading into Powers Lake.

The Water Quality Analysis Report 2010 (Appendix #3) was conducted from samples taken 2006-2009 and compared to 2001 have shown that this project is successfully reducing non-point source pollution loading into Powers Lake, demonstrated by the improved trophic condition of Powers Lake and improvement to the overall health of the watershed. However, due to drought conditions in 3 of the 4 years, stream sampling was very minimal.

The stream sites (See Appendix 1) were sampled for nutrients (total phosphorous, total nitrogen, nitrate-nitrite, ammonia and total kjeldahl nitrogen), and total suspended solids during the project.

The trends in improved water clarity and reduced chlorophyll-*a* concentrations in Powers Lake are supported by reduced total phosphorous and total nitrogen concentrations in the tributaries flowing into Powers Lake. However, internal cycling of phosphorous continues to be a problem as noted by the continued high phosphorous trophic state index.

It is expected that continued decreases in nutrient and sediment concentrations on the inlet streams will occur as a result of the many conservation practices that were implemented throughout the watershed through this project. It is also expected that algae blooms and lake clarity will continue to show gradual improvement with the reduction of pollutants entering the lake. However, it is not expected that the phosphorous concentrations in the lake itself will decrease any significant amount until practices are implemented to reduce the amount of in-lake phosphorous cycling.

The Powers Lake Nutrient Management Alternatives done by Houston Engineering Inc. in October 2008 found that based on bathymetric measurements, dredging 3.6 feet of the soft bottom material would increase the average lake depth from about 5.6 to about 9.2 feet with a maximum depth of 13.6 feet. Dredging will add depth to the lake, which would also remove possible internal sources of phosphorous and other materials that could be detrimental to lake-water quality. The increased depth resulting from dredging would make it more difficult for the wind energy to create enough turbulence to stir up bottom sediments. This phase of the project will only focus on dredging specific critical locations to gauge the feasibility and effectiveness of long term dredging throughout the lake. The selected areas to be dredged to reduce the amount of internal cycling of nutrients are located in Appendix 7.

3.0 Project Description

GOAL:

The goal of the Powers Lake Watershed Restoration Action Strategy is to reduce the amount of internal cycling of phosphorus in the lake by 50% to achieve and maintain fully supporting status of the recreational uses of Powers Lake through the implementation of certain BMPs and an active information and education program. This is a long term goal that will need to be accomplished in several phases. Phase I is completed and addressed nutrient loading coming into the lake through runoff from the watershed. This grant proposal addresses Phase II, which will concentrate on selective limited dredging with additional conservation practices applied throughout the watershed. From the data gathered in Phase I regarding nutrient concentration in the sediment, it is estimated that the removal of 23,200 CuYds of sediment along with the other practices described in this plan, will result in about a 20% reduction of internal cycling phosphorus load. This is an estimate based on literature and it is the purpose of this plan to determine how effective sediment removal is given the dynamics of a shallow lake, and if it will be effective on a larger scale. After Phase II is completed and data is analyzed, there is the possibility of moving towards Phase III which would continue to reduce nutrient loading towards the ultimate goal of a 50% reduction, through the use of more extensive dredging, alum treatments, and fetch reduction. Phase III will depend on the data gathered in this Phase (II) and funding available at that time.

Objective 1:

Enhance the effectiveness of in-lake restoration activities by supporting the implementation of additional BMP that will ensure nutrient (N & P) inputs from the watershed are maintained at or below concentrations documented at the end of phase I.

Task: 1
City of Powers Lake will employ a personnel to manage the project during the grant period. Responsibilities will include inventories, producer contacts, water quality sampling, permits, etc.

Product – Watershed Project Manager.
Cost – **$195,000**

Task: 2
City and landowners will develop nutrient management and resource management system plans on 5,000 acres of cropland. Plans will include BMPs such as field borders, nutrient management, tree plantings, conservation tillage and filter strips.

Product – Nutrient management and BMP contracts with individual producers.
Cost - **$22,000**

Task: 3
The City and landowners will develop rangeland and pasture management plans for 1,500 acres of land. Management plans will include BMPs such as fencing, pipelines, planned grazing systems, proper grazing use, tree plantings and pasture and hay land plantings.

Product – Rangeland and pasture BMPs
Cost - **$30,000**

Task: 4
The City and the landowner will consult with NDDH to determine applicability of current North Dakota livestock waste regulations. Management plans will include BMPs such as diversions, waste utilization and waste management systems. Financial and technical assistance will be limited to livestock feeding systems defined as small or medium animal feeding operations (AFO).

Product – One system will be implemented.
Cost – **$30,000**

Objective 2:
Improve riparian management on the shoreline of Powers Lake and associated tributaries to aid in decreasing the amount of phosphorus and TSS entering Powers Lake.

Task: 5
The City and landowners will develop riparian management plans on 1,000 feet of riparian areas adjacent to Powers Lake including its tributaries. Plans will include BMPs such as filter strips, livestock exclusion, fencing (protective), and wildlife wetland habitat management.

Product – Riparian BMPs
Cost - **$10,000**

Task: 6
The City and landowners will develop plans to improve 1,000 feet of shoreline from eroding into Powers Lake. Plans will include BMP's such as shoreline stabilization. Potential sites are located in Appendix 6.

Product – Shoreline BMP's
Cost - **$30,000**

Objective 3:
Increase awareness in the rural and urban watershed of the importance of daily practices to achieve and maintain fully supporting status of recreational uses of Powers Lake, by delivering a Watershed Information/Education Program on activities and accomplishments.

Task: 7
The City will conduct 5 annual public meetings on watershed accomplishments.

Product – Annual Meetings
Cost - **$2,500**

Task: 8
The City will work to increase awareness of EPA rules and regulations as well as NDDH rules and regulations and proper nutrient management within the watershed. There will be a minimum of 50 people informed.

Product – Tours, workshops, newspaper articles, local radio programs, web site, local access channel, displays, and one on one contacts.
Cost - **$2,500**

Task: 9
The City will implement a conservation education program with the Powers Lake Public School on watersheds and water quality as related to Powers Lake. There will be a minimum of 5 educational activities for the Schools.

Product – Education activities within the school.
Cost - **$500**

Task: 10
The City will carry out a general information and education program on the Lake Restoration utilizing local media sources including, but not limited to; radio, newspaper and other sources. There will be a minimum of 10 educational events for the community.

Product - Information programs
Cost - **$2,500**

Objective 4:

Reduce the amount of internal cycling of nutrients within Powers Lake through nutrient laden sediment removal. This will be accomplished in several phases. For the short term, under the Phase II proposal of this grant application, limited dredging will be conducted in critical areas to gauge phosphorus removal efficiency and the economic feasibility of widespread dredging operations throughout the lake. This will be the beginning stages of a long term goal to reduce the internal cycling by 50%, as stated in the TMDL, to meet state water quality standards. Financial support will need to be sought through alternative sources to complete the long term objective.

Task: 11
The City will meet with landowners to look at establishing a site for a disposal area and offer a rental lease agreement for the land. The land will be used as a disposal site and approximately 80 acres.

Product – Land Easement/Lease
Cost - **$32,000**

Task: 12
The City will work to obtain any and all necessary permits required.

Product – Obtain Permits

Task: 13
The City will work with a contractor to install a disposal site for distribution of the lake sediments.

Product – Construction Disposal Site
Cost - **$40,000**

Task: 14
The City will hire a contractor to dredge a portion of Powers Lake. The other option will be the City might purchase its own dredge and the dollars will be used for running the operation for example gas, oil, etc. The City is in full understanding that the money can not be used for purchase of dredge. The beginning stage is to remove 23,200 cubic/yards of sediment, this is based on a contractor estimate cost per cu/yd. Potential areas are identified in Appendix 7.

Product – Dredging
Cost - **$139,417**

3.3
See attached Milestone Table (Appendix #4)

3.4
Several permit requirement may be needed to complete some of the practices for example dredging, ag waste systems and shoreline stabilization work. For dredging we will need a 404 Army Corps of Engineers permit and a NDDH permit. Ag waste systems will require a permit/approval to operate from the NDDH. The State Historic Preservation Office (SHPO) will also be contacted regarding requirements related to potential BMP impacts to cultural resources.

3.5
The City of Powers Lake is the appropriate entity to coordinate and implement this project. The city council is a locally elected volunteer conservation organization that serves all people in the community. This project was developed at the beginning stages by the City of Powers Lake. They have been the leading organization since the beginning and would like to see this project to continue moving forward.

3.6
The City of Powers Lake will be responsible for auditing Operation & Maintenance Agreements (O&M) on BMPs during the project period through and completing yearly status reviews of EPA-319 contracts. The City of Powers

Lake will also be responsible for O&M for the containment site. The lifespan of each BMP will be listed in the individual contract to ensure longevity of the practices. The producer signs the "EPA 319 Funding Agreement Provisions" form, which explains in detail the consequences of destroying a BMP before the completion of its lifespan. The city council is a locally elected volunteer conservation organization that serves all people in the community.

4.0 Coordination Plan

4.1
The City of Powers Lake with the Powers Lake Advisory Committee (PLAC) is cooperating with many organizations and individuals, including the; North Dakota State Health Department, NRCS, and FSA.
NDDH – has provided technical and financial assistance for the assessment phase of the project.
NRCS – will provide technical assistance with further watershed evaluation and producer contracts.
The Powers Lake Advisory Committee includes members from the following agencies/organizations:
Community Members
Burke County SCD
Burke County Water Board
Burke County Commissioners
Mountrail SCD
Mountrail County Water Board
Mountrail County Commissioners
City of Powers Lake
Powers Lake Public School
The PLAC has been instrumental in organizing labor and community support for the project. They will continue to supervise the direction of this project.

4.2
Local support for the project shows in the response received from the monitoring phase and public meeting held to discuss water quality results and project potential. Attendance at public meetings, and requests for information on how to improve and protect the lake shows a broad-based support for actions necessary to accomplish this project. Sixty three people attended the public meeting at the end of Phase I with all in favor of continuing to a Phase II of the project.

4.3
The working relationship with numerous organizations during the Phase I part of the project shows the coordination with working with various agencies to succeed in the overall goal of establishing a quality lake once again.

4.4
The City of Powers Lake will continue working with EQIP, CRP, WHIP, FSA and other USDA programs. This EPA 319 project will be coordinated with these and other programs. The sponsor plans to coordinate with all agencies and individuals possible to carry out an efficient project and to utilize this project to fill in and offer assistance that is not available through programs listed. The sponsor will coordinate and communicate with other agencies to prevent the duplication of efforts with landowners.

5.0 Evaluation and Monitoring Plan

5.1

Monitoring strategy for Powers Lake Watershed and Lake, has not been developed, but will be done according to North Dakota Health Department Water Quality Division recommendations and standards. The Quality Assurance Project Plan (QAPP) will be developed by the NDDH after the project is fully approved and included in the final PIP submitted to the EPA.

6.0 Budget

6.1 See Attachments (Appendix #5)

7.0 Public Involvement

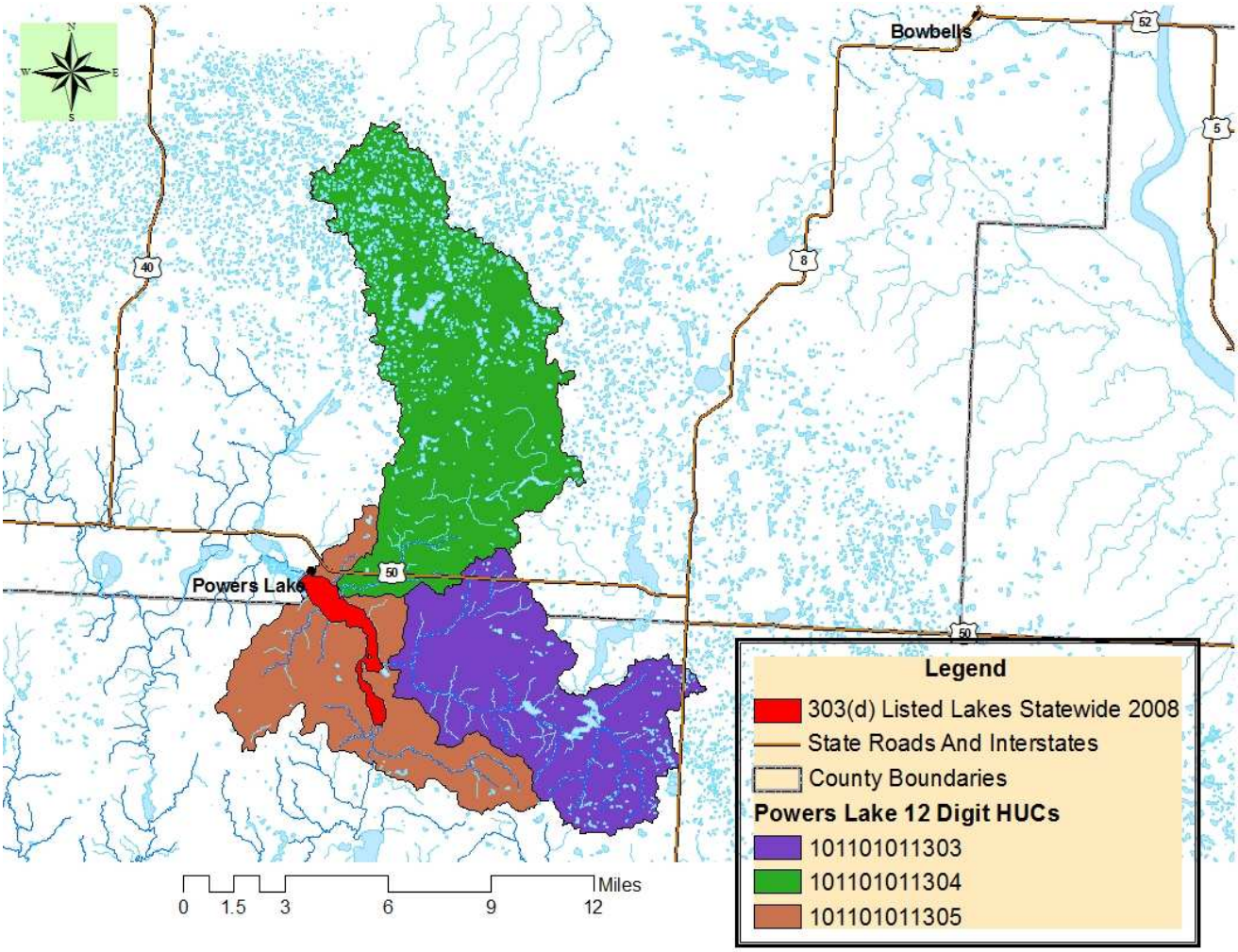
7.1
Educational and informational meetings will be conducted to keep the community informed. Community leaders, commissioners, water resource board members, city council members, and district supervisors will be involved in decision-making processes involving the implementation of BMPs within the Powers Lake Watershed.

Appendix List

1	Powers Lake Watershed Maps
2	Summary of Phase I Accomplishments
3	NDDH Brief Water Quality Discussion
4	Milestone Table
5	Budget
6	Potential Shoreline Stabilization Areas
7	Potential Dredging Area Locations

APPENDIX #1

Powers Lake Watershed Map



APPENDIX #2

Summary of Phase 1 Accomplishments

Cumulative #'s for Practices completed through All Programs during Phase I

BMP Type	Units
Res-Till 329A	15,484 ac.
Nutrient Mgt.	12,103 ac.
Past/Hay planting	1,053 ac.
Pipelines	32,320 ln. ft
Fence	66,349 ln. ft
Well	7 number
Tanks	23 number
Grazing Systems	4,790 ac.
Waste Mngt Sys.	1 number
Tree plantings	35,840 ln. ft
Well Decommissioning	1 number
Urban stormwater	1 number
Grass Easement	1,487 ac.
Wetlands created	9 number

APPENDIX #3

NDDH Brief Water Quality Discussion

SUMMARY

1. Water Body Information

State: North Dakota
County: Burke and Mountrail

Major River Basin: Missouri River Basin
8-Digit Hydrologic Unit Code: 10110101

Water-body Name: Powers Lake
Location: Burke and Mountrail Counties

Water-body size: 1,616 acres
Watershed Area: 44,458 acres(approximate)

Discharges to: Tributary to White Earth River

Designated Uses Impaired: 1) Aquatic Life (eutrophication, sedimentation, low dissolved Oxygen)
2) Recreation (Fishing, boating, swimming)

Constituent(s) of Concern: Phosphorus, Nitrates, Sediments, dissolved oxygen

Applicable Water Quality Standard:

Aquatic Life:

The quality of water shall be such to support the propagation of life, of both of resident fish species and other aquatic biota.

The standard for dissolved oxygen is 5 mg L^{-1}.

2. Water Quality Target Development

Bathtub Model:

In-lake water quality data and stream load were used to calibrate the U.S. Corps of Engineers Bathtub Model. Multiple simulations of the calibrated trophic response were run to identify the amount of reduction in external and internal loads of phosphorus and nitrogen required to get an improvement in lake trophic condition.

Water Quality Targets

Nutrient Target

The nutrient target is a 75 percent reduction in external and 50 percent reduction in internal phosphorus loads, expressed as a chlorophyll-*a* TSI value of 55.02 or lower (NDDoH, 2008).

Dissolved Oxygen Target

The dissolved oxygen target is the State water quality standard of a minimum of 5.0 mg/L.

Water Quality Results

D1. Lake Water Quality Results

One of the major goals of the Powers Lake Project improve the lake's trophic response by reducing the nutrient load, which will also improve dissolved oxygen levels. Powers Lake's trophic response was tracked numerically throughout the project using Carlson's Trophic Status index's for Chlorophyll-a and Secchi Disk.

Results for the long term monitoring of Powers Lake are encouraging as both secchi disk transparency and chlorophyll-a concentrations and resulting Carlson's TSI scores are improving (Table 1 and Figures 1 and 2). Of special note, the average TSI score for 2009 (53.24) more than met the goal of 55.02 as listed in the TMDL. The phosphorus TSI scores are high, but holding steady (Table 1 and Figure 1). This is the result of fewer

nutrients being added to the lake from the watershed, but the continued mixing and cycling of phosphorus in the lake bottom sediments. It is the plan of the Powers Lake Watershed Committee to implement Phase II of the restoration plan designed at addressing the in-lake nutrient cycling, as soon as funding sources are found.

Table 1. Average TSI Scores for Powers Lake, 2001 - 2009.

Year	Average Phosphorus TSI	Average Chlorophyll-a TSI	Average Secchi TSI
2001	85.09	70.61	81.85
2006	83.29	62.45	80.54
2007	85.86	59.59	78.51
2009	85.78	53.24	71.75

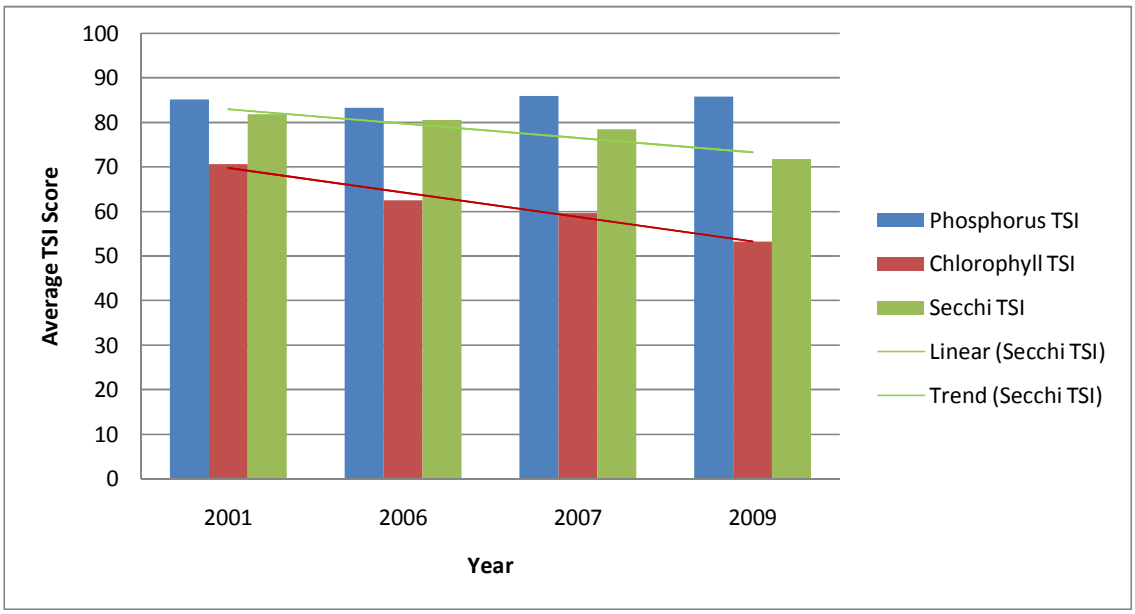


Figure 1. Average TSI Scores for Powers Lake Showing Trends, 2001 – 2009.

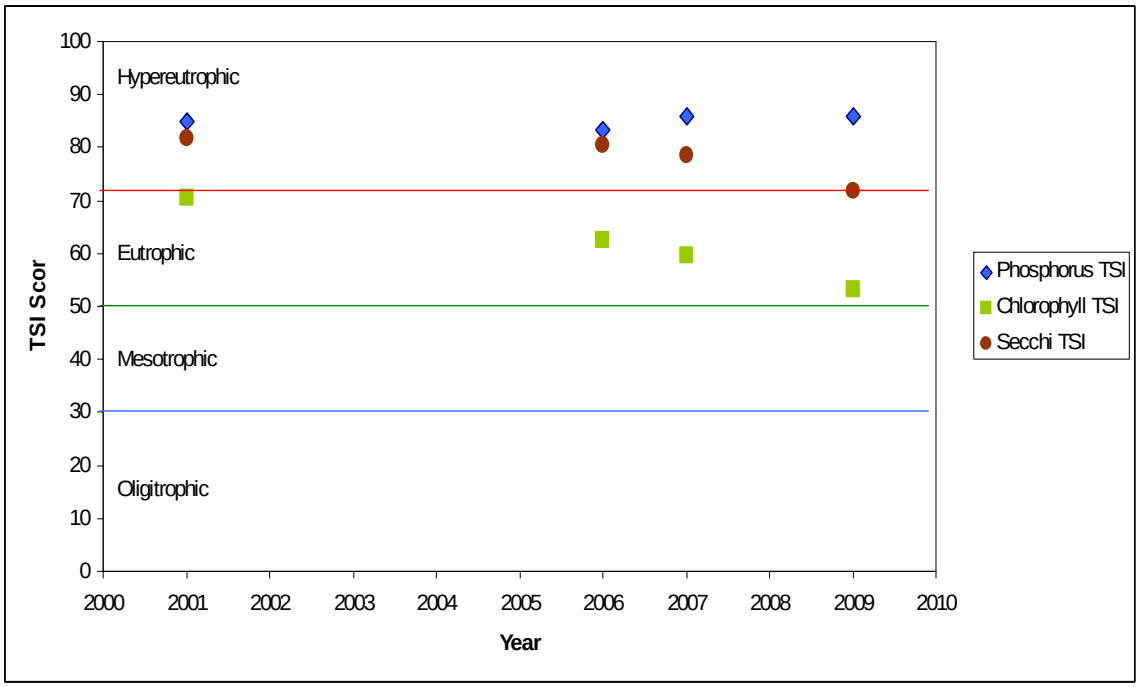


Figure 2. TSI Scores for Powers Lake Showing Trophic State, 2001 – 2009.

Additional indications of lake improvement are generally improved dissolved oxygen concentrations. In 2001, the lake was below the State's dissolved oxygen concentration of 5.0 mg/L for parts of September and October (Figure 3). In 2006, the lake was only below standards at the sediment –water interface for one sample in September (Figure 4). The third year of a drought cycle, 2007 had dissolved oxygen readings just below the standard at the 4.0 mg/L mark for July and August, but rebounded with some late summer rains (Figure 5). The few readings in 2008 were all above standards (Figure 6), and in 2009, the only problems were in late August with dips just below the standard (Figure 7).

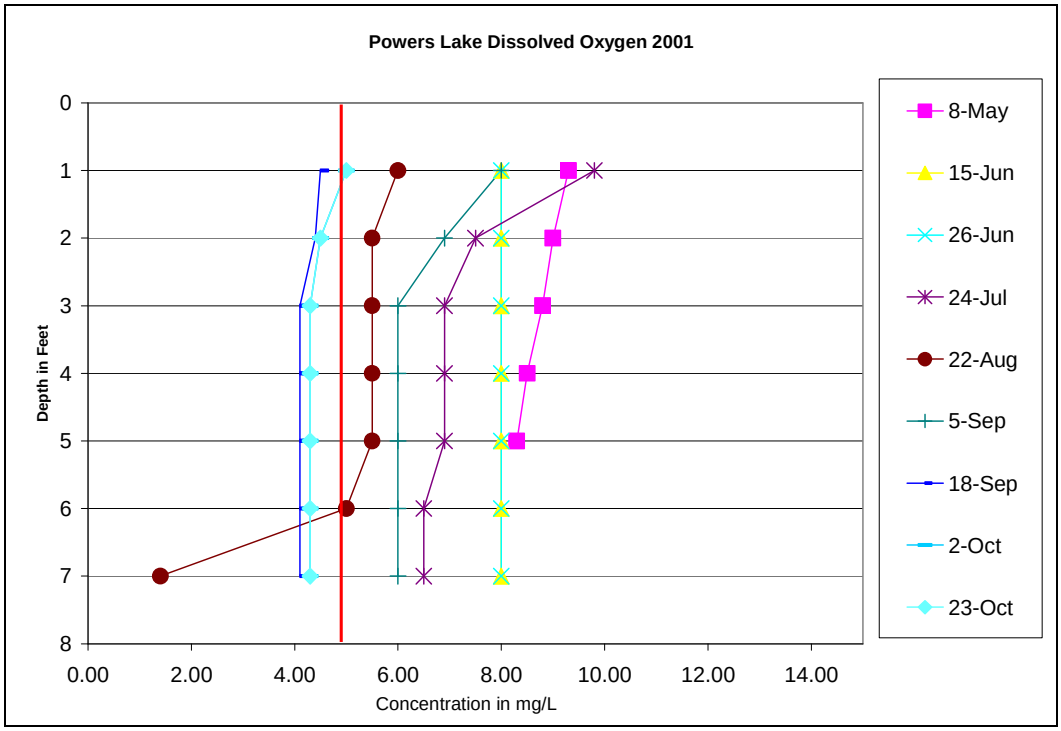


Figure 3. Dissolved oxygen profiles 2001.

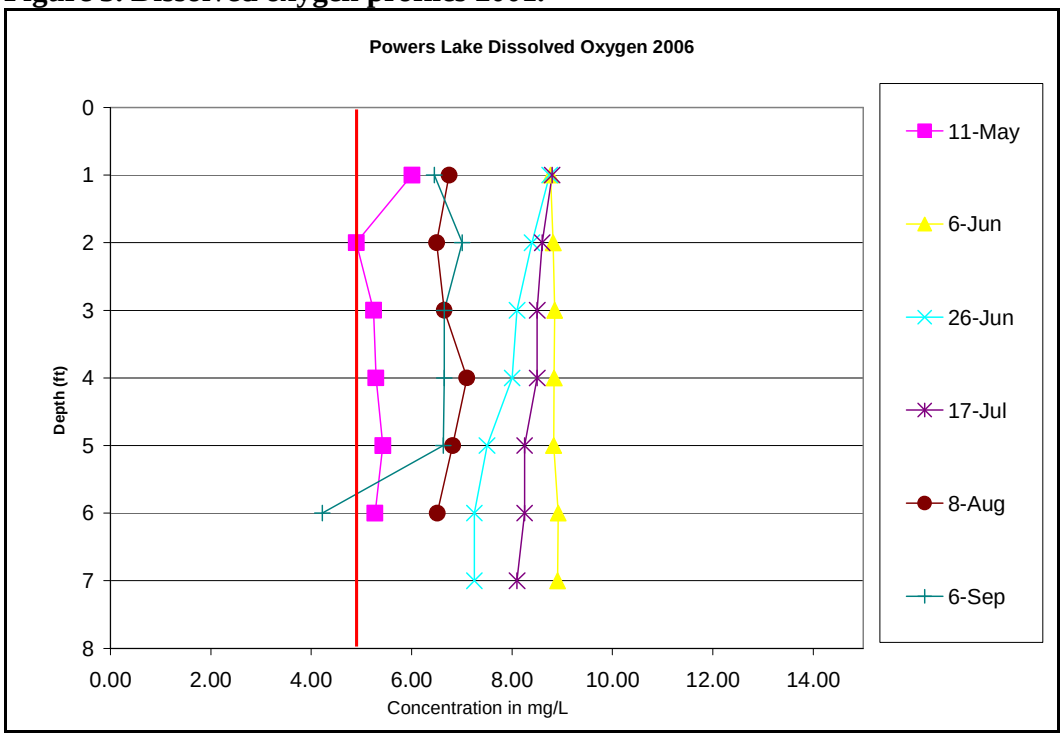


Figure 4. Dissolved oxygen profiles 2006.

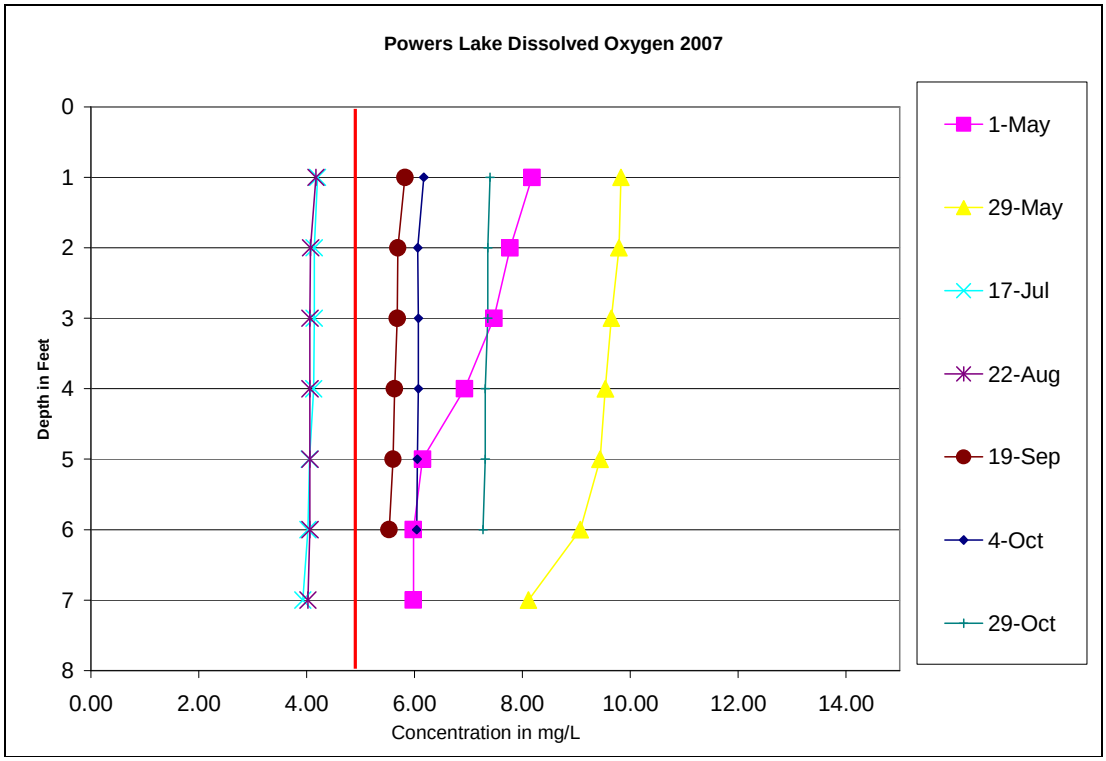


Figure 5. Dissolved oxygen profiles 2007.

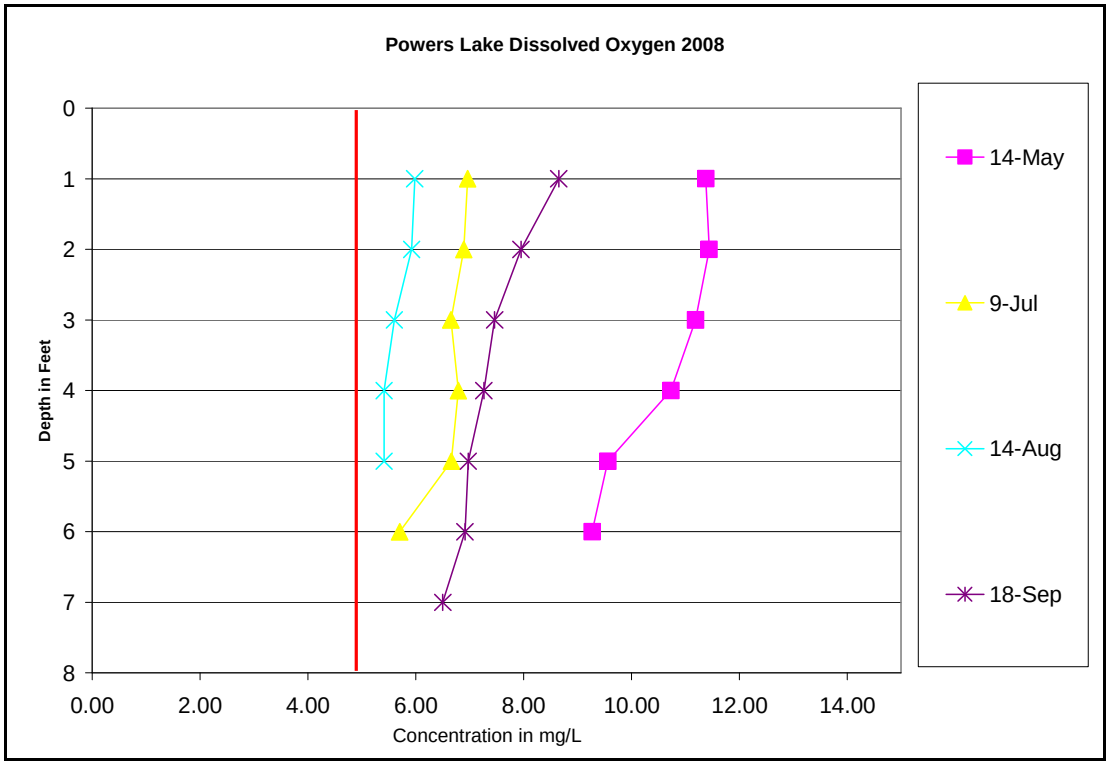


Figure 6. Dissolved oxygen profiles 2008.

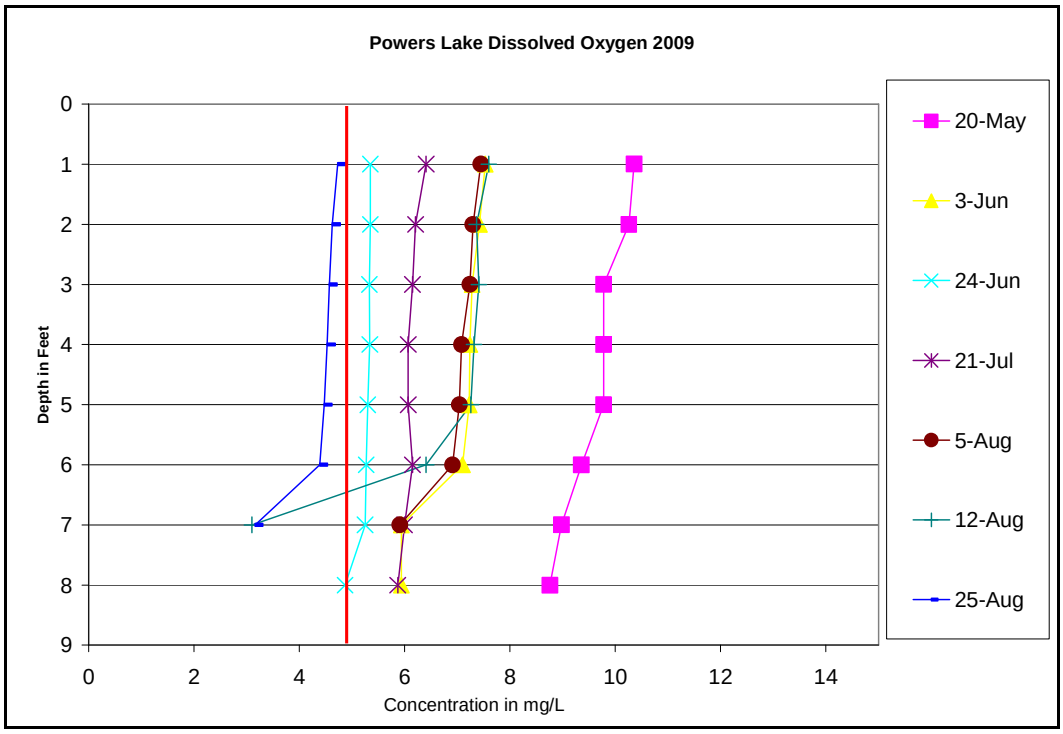


Figure 7. Dissolved oxygen profiles 2009.

4.0 Margins of Safety:

1) Conservative modeling assumption.
2) Setting targets during the most critical period.
3) Aggressive reduction and improvement targets
4) Continued monitoring to ensure full support of the beneficial uses Aquatic Life and Recreation.

Acknowledgments

Numerous scientists, chemist, and technicians have made contributions to the Powers Lake Watershed Project. Special thanks goes to Heather Duchscherer for her analysis work. Appreciation goes to the staff of the North Dakota Department of Health's Division of Chemistry and Microbiology, for their accurate and timely analysis of water quality samples.

Funding for this project was provided through a U.S. Environmental Protection Agency, Section 319 Non-Point Source Pollution Grant.

APPENDIX #4

Milestone Table

MILESTONE TABLE -- POWERS LAKE WATERSHED RESTORATION ACTION STRATEGY Page 1

Task	Responsibility	Output	2011	2012	2013	2014	2015
Task 1: Employ Project Manager 1 employed	City of PL	Watershed Project Manager					
Task 2: Nutrient management plans 5000 ac.	City of PL						
Task 3: Range management plans 1,500 ac.	City of PL						
Task 4: Livestock waste systems 1 number	City of PL						
Task 5: Riparian management plans 1, 000 ft.	City of PL						
Task 6: Shoreline Stabilization 1,000 ft.	City of PL						
Task 7: Watershed meetings 5 meetings	City of PL						
Task 8: Conservation workshops 50 people	City of PL						
Task 9: Conservation education 5 activities	City of PL						
Task 10: Lake Restoration education 10 meetings	City of PL						
Task 11: Land Easement 80 ac.	City of PL						
Task 12: Obtain Permits	City of PL						
Task 13: Disposal Site Construction	City of PL						
Task 14: Dredging 23,200 cu/yds	City of PL						

APPENDIX #5

Budget Tables

BUDGET TABLE
POWERS LAKE WATERSHED RESTORATION ACTION STRATEGY

PART 1: Funding Sources	2011	2012	2013	2014	2015	Totals
US EPA						
Section 319 Funds (FA)	$ 30,420.00	$ 65,220.00	$ 85,620.00	$125,380.00	$ 26,710.00	$332,350.00
Other Federal Funds						
1) NRCS	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 50,000.00
2) USFW&S	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 10,000.00
3) RC&D	$ 300.00	$ 300.00	$ 300.00	$ 300.00	$ 300.00	$ 1,500.00
4) ND Department of Health	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 25,000.00
Subtotals	$ 17,300.00	$ 17,300.00	$ 17,300.00	$ 17,300.00	$ 17,300.00	$ 86,500.00
State & Local Match						
1) Local SCDs (TA & FA)	$ 1,000.00	$ 1,000.00	$ 1,000.00	$ 1,000.00	$ 1,000.00	$ 5,000.00
2) Landowners (FA)	$ 3,240.00	$ 15,000.00	$ 20,000.00	$ 20,000.00	$ 10,000.00	$ 68,240.00
3) ND Game & Fish (TA)						$ -
4) City of Powers Lake	$ 12,000.00	$ 23,440.00	$ 27,040.00	$ 48,547.00	$ 15,300.00	$ 126,327.00
5) Burke County	$ 0.00	$ 0.00	$ 5,000.00	$ 10,000.00	$ 0.00	$ 15,000.00
6) Powers Lake Park District	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 10,000.00
Subtotals	$ 18,240.00	$ 41,440.00	$ 55,040.00	$ 81,547.00	$ 27,300.00	$224,567.00
TOTAL BUDGET	$ 65,960.00	$123,960.00	$157,960.00	$224,227.00	$71,310.00	$643,417.00

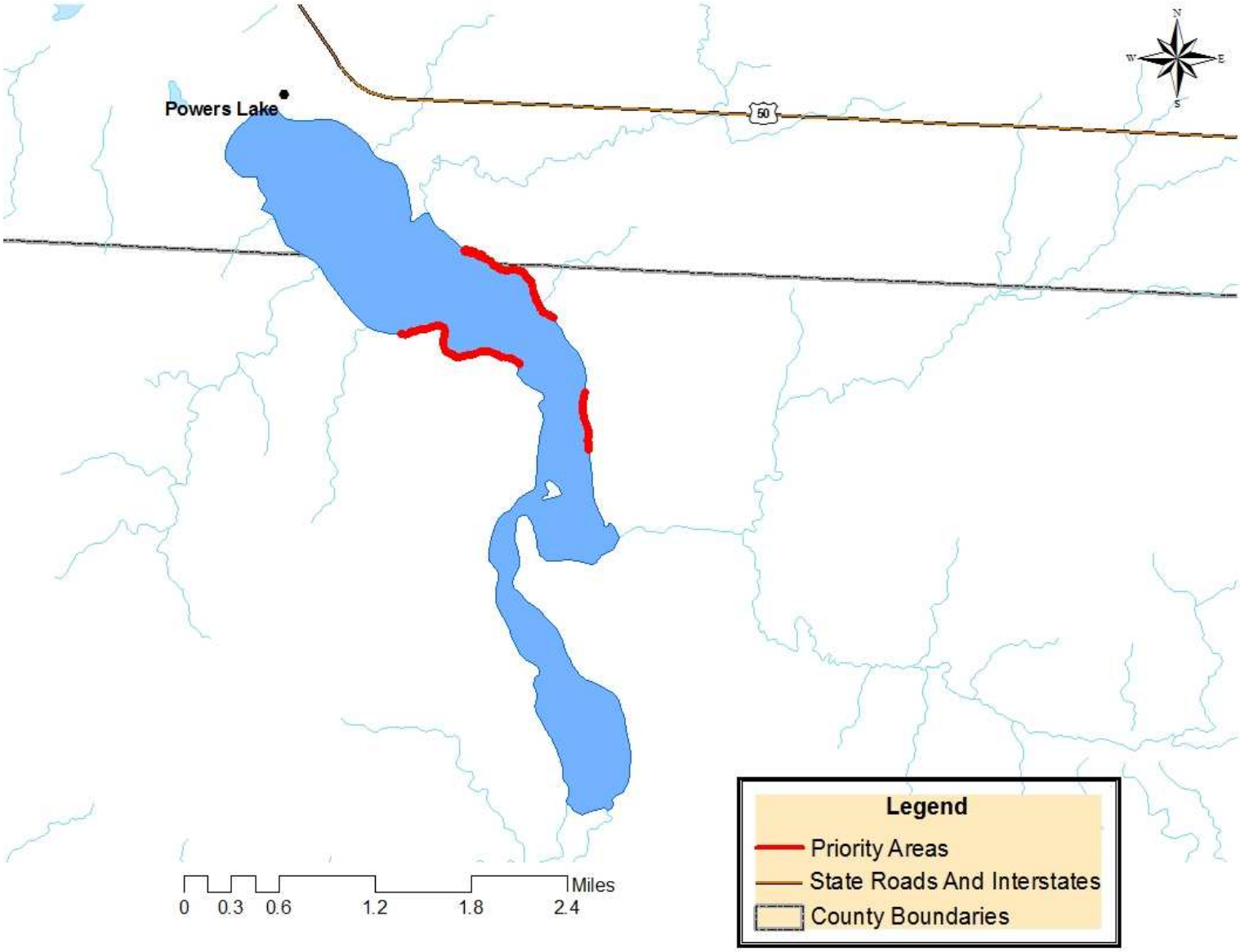
FA: Financial Assistance
TA: Technical Assistance

SCD: Soil Conservation District
WRB: Water Resource Board
NRCS: Natural Resources Conservation Service
RC&D: Resource Conservation & Development
USF&WS: U.S. Fish & Wildlife Service

PART 2: Section 319/Non-federal Budget	2011	2012	2013	2014	2015	Total Costs	Cash Match	In-kind Match	319 Funds
Personnel/Support									
1) Salary	$37,000.00	$38,000.00	$39,000.00	$40,000.00	$41,000.00	$195,000.00	$78,000.00		$117,000.00
2) Office Rent/Utilities	$4,200.00	$4,200.00	$4,200.00	$4,800.00	$4,800.00	$22,200.00		$22,200.00	
3) Travel	$500.00	$500.00	$500.00	$750.00	$750.00	$3,000.00	$1,200.00		$1,800.00
4) Equipment/Supplies	$500.00	$500.00	$500.00	$500.00	$500.00	$2,500.00	$1,000.00		$1,500.00
5) Training	$500.00	$500.00	$500.00	$500.00	$500.00	$2,500.00	$1,000.00		$1,500.00
6) Telephone	$1,000.00	$1,000.00	$1,000.00	$1,000.00	$1,000.00	$5,000.00	$2,000.00		$3,000.00
Subtotals	$43,700.00	$44,700.00	$45,700.00	$47,550.00	$48,550.00	$230,000.00	$83,200.00	$22,200.00	$124,800.00
Objective 1: Additional BMP's in Watershed									
Task 1: Project Mngr. (see above)									
Task 2: Nutrient mngmt plans w/ BMPs(5,000 ac.)	$3,000.00	$3,000.00	$3,000.00	$3,000.00	$10,000.00	$22,000.00	$8,800.00		$13,200.00
Task 3: Range Mngmt plans (1,500 ac.)	$0.00	$10,000.00	$10,000.00	$5,000.00	$5,000.00	$30,000.00	$12,000.00		$18,000.00
Task 4: Livestock waste systems (1 number)	$0.00	$0.00	$30,000.00	$0.00	$0.00	$30,000.00	$12,000.00		$18,000.00
Subtotal	$3,000.00	$13,000.00	$43,000.00	$8,000.00	$15,000.00	$82,000.00	$32,800.00		$49,200.00
Objective 2: Riparian Management									
Task 5: Riparian mngmt plans (1,000 ft)	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$10,000.00	$4,000.00		$6,000.00
Task 6: Shoreline Stabilization (1,000 ft)		$10,000.00	$10,000.00	$10,000.00		$30,000.00	$12,000.00		$18,000.00
Subtotal	$0.00	$15,000.00	$10,000.00	$10,000.00	$5,000.00	$40,000.00	$16,000.00		$24,000.00
Objective 3: Information/Education									
Task 7: Public watershed meetings (5 meeting)	$500.00	$500.00	$500.00	$500.00	$500.00	$2,500.00	$1,000.00		$1,500.00
Task 8: Conservation education (50 people)	$500.00	$500.00	$500.00	$500.00	$500.00	$2,500.00	$1,000.00		$1,500.00
Task 9: Conservation ed. in school (5 events)	$100.00	$100.00	$100.00	$100.00	$100.00	$500.00	$500.00		$0.00
Task 10: Lake restoration campaign(10 events)	$500.00	$500.00	$500.00	$500.00	$500.00	$2,500.00	$1,000.00		$1,500.00
Subtotal	$1,600.00	$1,600.00	$1,600.00	$1,600.00	$1,600.00	$8,000.00	$3,500.00		$4,500.00
Objective 7: Disposal Site									
Task 11: Land Easement (80 ac.)		$32,000.00				$32,000.00	$12,800.00		$19,200.00
Task 12: Obtain Permits						$0.00	$0.00		$0.00
Task 13: Construction (1 disposal site)			$40,000.00			$40,000.00	$16,000.00		$24,000.00
Task 14: Dredge (23,200 cu/yds)	$0.00	$0.00	$0.00	$139,417.00	$0.00	$139,417.00	$55,766.80		$83,650.20
Subtotal	$0.00	$32,000.00	$40,000.00	$139,417.00	$0.00	$211,417.00	$84,566.80		$126,850.20
Administrative – City of Powers Lake									
(City Auditor $125/mth X 12mths)	$1,500.00	$1,500.00	$1,500.00	$1,500.00	$1,500.00	$7,500.00	$4,500.00		$3,000.00
(Board 1 hr/mth X 5 X 12mths X $15)	$ 900.00	$ 900.00	$ 900.00	$ 900.00	$ 900.00	$4,500.00		$4,500.00	
Subtotal	$2,400.00	$2,400.00	$2,400.00	$2,400.00	$2,400.00	$9,500.00	$4,500.00	$4,500.00	$3,000.00
TOTAL 319/NON-FEDERAL BUDGET	$50,700.00	$108,700.00	$142,700.00	$208,967.00	$72,550.00	$583,617.00	$224,566.80	$26,700.00	$332,350.20

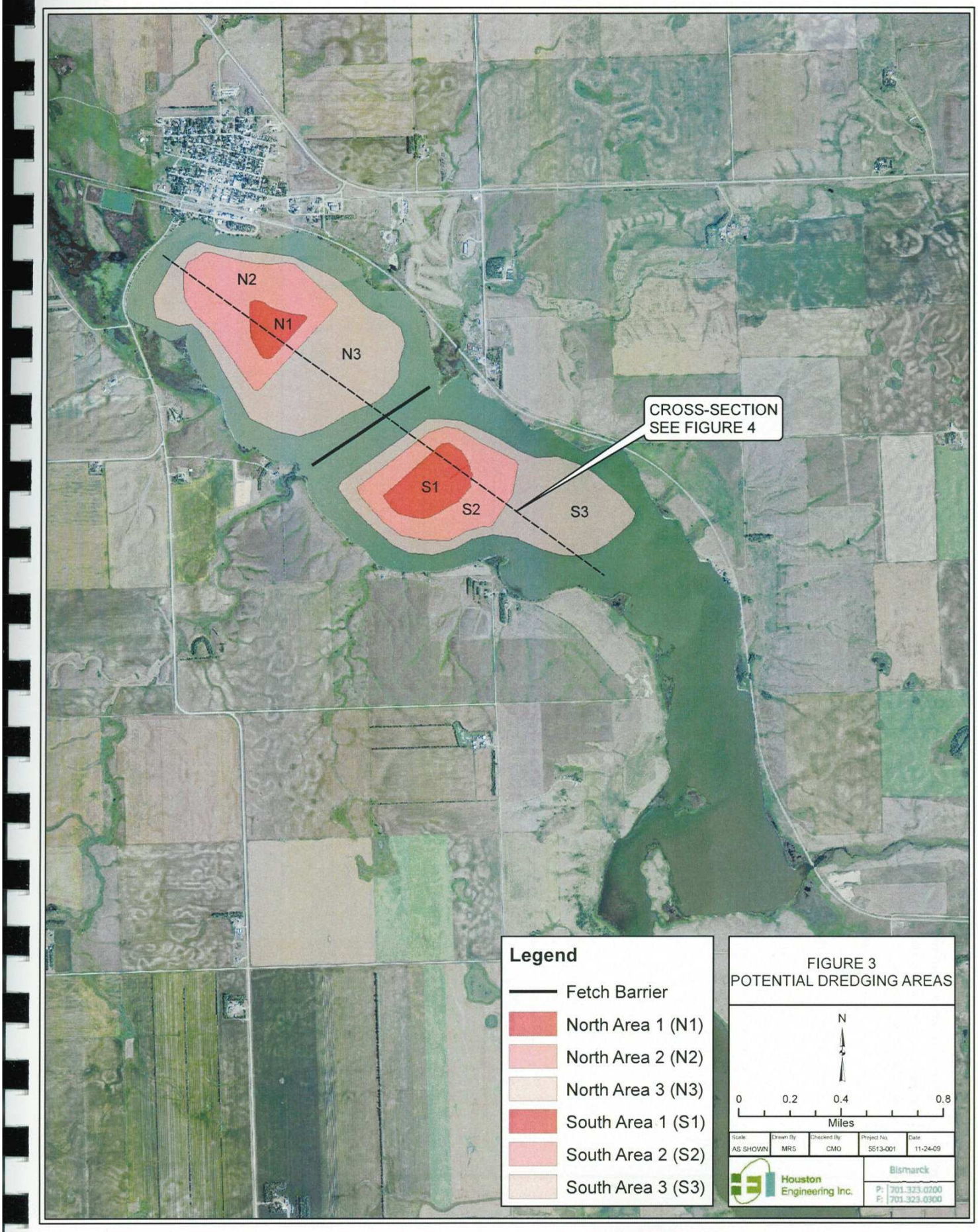
APPENDIX # 6

Potential Shoreline Stabilization Areas



APPENDIX # 7

Potential Dredging Area Locations


N2
N1
N3
CROSS-SECTION
SEE FIGURE 4
S1
S2
S3
Legend
Fetch Barrier
North Area 1 (N1)
North Area 2 (N2)
North Area 3 (N3)
South Area 1 (S1)
South Area 2 (S2)
South Area 3 (S3)
FIGURE 3
POTENTIAL DREDGING AREAS
N
0
0.2
0.4
0.8
Miles
Scale: AS SHOWN
Drawn By: MRS
Checked By: CMO
Project No.: 5513-001
Date: 11-24-09
Houston Engineering Inc.
Bismarck
P: 701.323.0200
F: 701.323.0300